

Rec'd PCT/PTC 26 SEP 2000
09/647129

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith are being deposited with the United States Postal Service on this date shown below in an envelope as "Express Mail Post Office to Addressee" under the below indicated Mailing Label Number, addressed to: Box PCT, Assistant Commissioner for Patents, Washington, D.C. 20231.

Mailing Label No.: EK347082677US

Deposit Date: September 26, 2000

Name: Diane M. Hixson

ATTORNEY'S DOCKET No. TURKP0114US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
(DO/EO/US)**

In re national phase of:

Applicant(s): Dieter Döhring
International Application No.: PCT/EP99/00604
International Filing Date: 26 January 1999
Title of Invention: METHOD FOR IMPREGNATING DECORATIVE PAPERS

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING ENTRY INTO U.S. NATIONAL PHASE UNDER 35 U.S.C. 371

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information under 35 U.S.C. 371:

1. This express request to immediately begin national examination procedures (35 U.S.C. 371(f)).
2. The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees (37 CFR 1.492) as indicated below.

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3. A copy of the International application (35 U.S.C. 371(c)(2)):
 - a. is transmitted herewith
(International Publication No. PCT/EP99/00604).
 - b. is not required, as the application was filed with the United States Receiving Office.
 - c. has been transmitted by the International Bureau. A copy of Form PCT/1B/308 is enclosed.
4. A translation of the International application into the English language (35 U.S.C. 371(c)(2)) is transmitted herewith.
5. Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. 371(c)(3)):
 - a. are transmitted herewith.
 - b. have been transmitted by the International Bureau.
6. A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. 371(c)(3)) is transmitted herewith.
7. A copy of the international examination report (PCT/IPEA/409)
 - a. is transmitted herewith.
 - b. is not required as the United States Patent and Trademark Office was the IPEA.
8. Annex(es) to the international preliminary examination report
 - a. is/are transmitted herewith.
 - b. is not required as the United States Patent and Trademark Office was the IPEA.
9. A translation of the annexes to the international preliminary examination report is transmitted herewith.
10. An oath or declaration of the inventor (35 U.S.C. 371(c)(4)) complying with 35 U.S.C. 115 is submitted herewith.

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11. An International Search Report (PCT/ISA/210)
 - a. is transmitted herewith.
 - b. has been transmitted by the International Bureau.
 - c. is not required, as the application was searched by the United States International Searching Authority.
12. An Information Disclosure Statement under 37 CFR 1.97 and 1.98 is transmitted herewith, along with Form PTO-1449 and copies of citations listed.
13. An assignment document is transmitted herewith for recording, along with a separate cover sheet.
14. A preliminary amendment is enclosed.
15. A verified statement claiming small entity status is enclosed.
16. Other:

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Basic National Fee					Fee
IPEA - US				\$670.00	
ISA - US				\$760.00	
PTO not ISA or IPEA				\$970.00	
Claims meet PCT Art. 33(1)-(4) - IPEA - US				\$96.00	
Filing with EPO or JPO search report				\$840.00	
Enter appropriate basic fee →					\$840.00
Claims*	Number filed		Number extra	Rate	
Total claims	7	-20	0	\$18.00	\$0.00
Independent claims	1	-3	0	\$78.00	\$0.00
Multiple dependent claims (if applicable)				\$260.00	
Total of above					\$840.00
Small entity statement enclosed, 1 if Yes, 0 if No →				0	\$0.00
Total national fee					\$840.00
Fee for recording enclosed assignment				\$40.00	
Total fees enclosed					\$840.00

*After any attached preliminary amendment reducing the number of claims and/or deleting multiple dependencies.

A check in the amount of \$ 840.00 to cover the above fees is enclosed.

Please charge our Deposit Account No. 18-0988 in the amount of \$ _____. A duplicate copy of this sheet is enclosed.

WARNING: TO AVOID ABANDONMENT OF THE APPLICATION THE BASIC NATIONAL FEE MUST BE PAID WITHIN THE 20/30 MONTH TIME LIMIT.

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16. The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to our Deposit Account No. 18-0988:

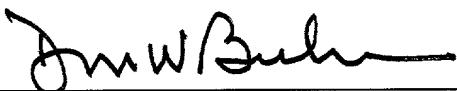
a. 37 CFR 1.492(a)(1), (2), (3), (4) and (5) (filing fees)

WARNING: BECAUSE FAILURE TO PAY THE NATIONAL FEE WITHIN 30 MONTHS WITHOUT EXTENSION (37 CFR § 1.495(B)(2)) RESULTS IN ABANDONMENT OF THE APPLICATION, IT WOULD BE BEST TO ALWAYS CHECK THE ABOVE BOX.

b. 37 CFR 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid on these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

Respectfully submitted,



Don W. Bulson, Reg. No. 28,192

Direct all correspondence and telephone calls to:

Don W. Bulson, Esq.
RENNER, OTTO, BOISSELLE & SKLAR, LLP
1621 Euclid Avenue, 19th Floor
Cleveland, Ohio 44115
Tel: 216-621-1113 Fax: 216-621-6165
Internet: dbulson@rennerotto.com

KRONOSPAN

TECHNICAL COMPANY LTD., Iasonos Street,

Nicosia 1082, Cyprus

Method of Impregnating Decorative Papers

5

The invention relates to a method of impregnating decorative or patterned papers used for the production of highly wear-resistant laminate flooring materials, in which the decorative paper is first moistened and impregnated with an amino resin as well as the resin content being regulated in this step

10

It is known (patent of Graudenz et al.), to produce highly wear-resistant decorative paper impregnates for laminate flooring materials. In this known process, after the actual impregnation, there is applied to the 15 patterned paper a mass in which the particulate corundum is held relatively stable by special viscosity-increasing substances in a dispersion forming the mass.

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In this arrangement the mass is applied by means of spreading rollers still in the wet phase directly after the impregnation or alternatively in an intermediate drying stage.

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In this known technology making use of spreading rollers the corundum-containing mass is present in reservoir vessels in which there are formed dead zones, in which there is little movement of the mass. Accordingly the corundum particles settle out, which has the consequence of a lack of homogeneity in the application of the corundum to the paper and thereby substantial variations in the wear resistance values of the resulting laminate flooring materials.

30

For this reason hitherto viscosity-increasing substances, as a rule cellulose derivatives, have been added to the mass containing the corundum mixture. Furthermore the corundum should be relatively fine, as the lighter or finer corundum particles are less rapidly precipitated.

5 However the introduction of cellulose derivatives leads to an optical dulling of the surface of the laminate flooring materials produced.

The finer the particle size of the corundum, the more must be the proportion of it applied to the decorative paper in order to achieve
10 sufficient wear resistance. Also this results in a dulling of the surface of the materials produced.

The invention is based on solving the problem of avoiding the above-mentioned drawbacks of the known manufacture of highly wear-resistant
15 laminate flooring materials and to be able to produce highly wear-resistant decorative laminate flooring materials, the decorative paper which exhibits the surface structure being at the same time coated with particulate corundum without the surface of the flooring materials thus produced showing any dulling.

20

This problem is solved according to the present invention by a process having a features of the independent Claim 1.

Preferred embodiments and further features of the invention are the
25 subject of the dependent claims.

One of the important differences of the process according to the invention lies in the fact that the mass or dispersion used for impregnating the decorative paper and for applying the wear-resistant bodies such as
30 corundum particles is sprayed on or applied by the nozzle principle.

The nozzle principle has the advantage over application by rolling that the dispersion containing the wear-resistant bodies such as corundum particles is continuously and thoroughly stirred around before application and
5 thereby is more or less uniformly moved. Accordingly appearances of deposits which lead to a lack of uniformity are not observed. Therefore also one can dispense with the addition of viscosity-increasing materials or substances. On the contrary in fact one can introduce flow-promoting materials which achieve an improved distribution of the wear-resistant
10 material such as corundum, which is of advantage in the press used for compressing the material.

A further advantage lies in the fact that one does not need to pay particular attention to using aluminium oxide of a particularly fine
15 particle size, but that corundum or other particulate wear-resistant material having a significantly larger or coarser particle size can be employed. This has the further consequence that relatively small quantities of corundum or other particulate wear-resistant material are required in order to achieve high values of wear-resistance.

20

The consequence of these measures and advantages is that particularly transparent and brilliant surfaces of laminate flooring materials can be achieved according to the invention.

25

A further advantage of the invention lies in the fact that one does not, as in the known application of the mass or dispersion used for impregnation by means of spreading rollers, have to proceed with a relatively slow impregnation velocity of for example 18 to 25 m/min, in order to achieve
30 an adequately uniform application, but that using the process according to

the invention, in which the mass or dispersion is supplied by means of nozzles, one can achieve or realise impregnation velocities of 40 to 50 m/min.

5 The invention is further explained in the following in conjunction with embodiments by way of example.

Example 1:

10 A special dispersion is first pre-mixed in a reservoir vessel having stirring means. Stirred into this are 200 kg melamine resin (Kauramin soaking resin 786 from Messrs BASF), 10 kg water, 1.5 kg of a wetting agent, 0.4 kg of a separating agent and 1.5 kg hardener (H 527 from Messrs BASF). Then there is added 80 kg. corundum having a mean
15 particle size of 135 $\mu\text{-m}$. After 10 minutes of stirring 25 kg of ϵ caprolactam and 0.9 kg of a commercially available silane adhesion promoter are added.

20 A standard impregnating channel made by Messrs VITS is provided following the impregnating means with feed-in means comprising a wide roller, a direction-reversing roller, a nozzle gap with receiving vessel, a pair of metering rollers as well as wire supporting rollers.

25 A decorative or patterned paper web having a density of 70 g/m² is fed through the impregnating equipment and the additional structure. In the standard impregnating equipment an initial resin take-up of 75 g/m² (obtained after drying) is set. When this value is reached the nozzle is set in operation and the special dispersion is applied. Through the second pair of metering rollers a final mass of 155 g/m² is set. The paper treated

in this way is conducted through a drier at a speed of 45 m/min. The residual moisture content amounts to 6.1 %.

The decorative or patterned paper is subsequently pressed in a short
5 stroke press to form an HDF supporting plate (pressing temperature 180°
C, pressing time 20 s). There is obtained a brilliant surface which fulfils
the requirements of pr-EN 13329 and has a wear-resistance value of IP
12,000

10 **Example 2:**

Like Example 1. Instead of corundum, particulate silicon carbide having a mean particle size of 125 µ-m is used. A dark-coloured decorative paper is employed.

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Example 3:

Like Example 1. However instead of corundum there is used a mixture of 75 % aluminium oxide having a mean particle size of 125 µ-m and 25 %
20 silicon carbide having the same mean particle size.

I CLAIM:

1. A method of impregnating decorative paper used for the production of highly wear-resistant laminate flooring material comprising:

5

a) taking decorative paper;

b) damping and impregnating said decorative paper with an amino resin by the use of metering rollers; and

10

c) additionally spraying onto said damped wet decorative paper an additional layer of amino resin in a special dispersion; and wherein the final area density relative to the dry mass of raw paper amounts to 100% to 25%.

15

2. Method according to Claim 1, wherein a dispersion of 100 parts of an amino resin, 20 to 95 parts of abrasive substance, 0.5 to 2.5 parts of a silane adhesion promoter, 5 to 25 parts of a flow-promoting agent, 0.1 to 0.4 parts of a wetting agent, 0.05 to 0.4 parts of a separating agent and of 20 an amino resin hardener is employed.

3. Method according to Claim 1, wherein a melamine resin is employed as the amino resin.

25

4. Method according to Claim 1, wherein polyglycol ether, e-caprolactam or butane diol is employed as the flow-promoting agent.

5. Method according to Claim 1, wherein silicon carbide having a mean particle size of 60 to 160 $\mu\text{-m}$ is employed as the abrasive substance.

30

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6. Method according to Claim 1, wherein aluminium oxide in the form or corundum or out of the melt with a particle size of 60 to 160 $\mu\text{-m}$ is employed as the abrasive substance.

5 7. Method according to Claim 1, wherein a mixture of silicon carbide and aluminium oxide is employed as the abrasive substance in a suitable mixture.

RENNER, OTTO, BOISSELLE & SKLAR



Attorney Docket No.

TURKP0114US

PATENT (OUS)

NOV 27 2000

**COMBINED DECLARATION AND POWER OF ATTORNEY
(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT)**

I, a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Title: METHOD OF IMPREGNATING DECORATIVE PAPERS

the specification of which

[] is attached hereto, or

[X] was filed as United States Application or PCT International Application (give Express Mail label number and deposit date if Application number not yet known): Application No.: (Express Mail Label No.) Filing Date: January 26, 1999 Amended on (if applicable):

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56(a).

PRIORITY CLAIM

I hereby claim priority benefits under Title 35, United States Code, §119 of (i) any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed; and (ii) any United States provisional application(s) that is/are listed below.

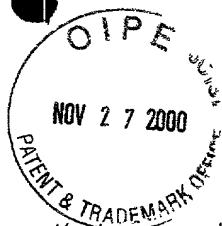
[X] no such applications have been filed.
[] such applications have been filed as follows.

**EARLIEST FOREIGN/PROVISIONAL APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED	
			Yes	No

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

RENNER, OTTO, BOISSELLE & SKLAR



As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

(3) Armand P. Boisselle, Reg. No. 22,381; Warren A. Sklar, Reg. No. 26,373; Don W. Bulson, Reg. No. 28,192

The undersigned to this declaration and power of attorney hereby authorizes the U.S. attorney(s) named herein to accept and follow instructions from

Authorized representative: Gille Hrabal Struck Neidlein Prop Roos, Brucknerstr. 20, D-40593 Düsseldorf, Germany

as to any actions to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney(s) and the undersigned. In the event of a change in the person(s) from whom instructions may be taken, the U.S. attorney(s) will be so notified by the undersigned.

Send Correspondence To

Direct Telephone Calls To:

(name and telephone number)

Don W. Bulson, Esq.
Renner, Otto, Boisselle & Sklar, LLP
1621 Euclid Ave., 19th Floor
Cleveland, Ohio 44115

Don W. Bulson

(216) 621-1113

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therein.

Full Name of Sole or First Inventor: Dieter Döhring			
Inventor's signature:			Date: 26.9.00
Residence: (City & State/Country):	Lampertswalde/Germany	DEX	Citizenship: Germany
Post Office Address:	Mühlbacher Straße 1 D-01561 Lampertswalde Germany		

Full Name of Additional Joint Inventor (if any):

Inventor's signature:		
Residence: (City & State/Country):		
Post Office Address:		

**CHECK FOR ANY OF THE FOLLOWING ADDED PAGE(S) WHICH
FORM A PART OF THIS DECLARATION**

[] Signature for additional joint inventors.
[] Added page to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (CIP) application.
[X] This declaration ends with this page.